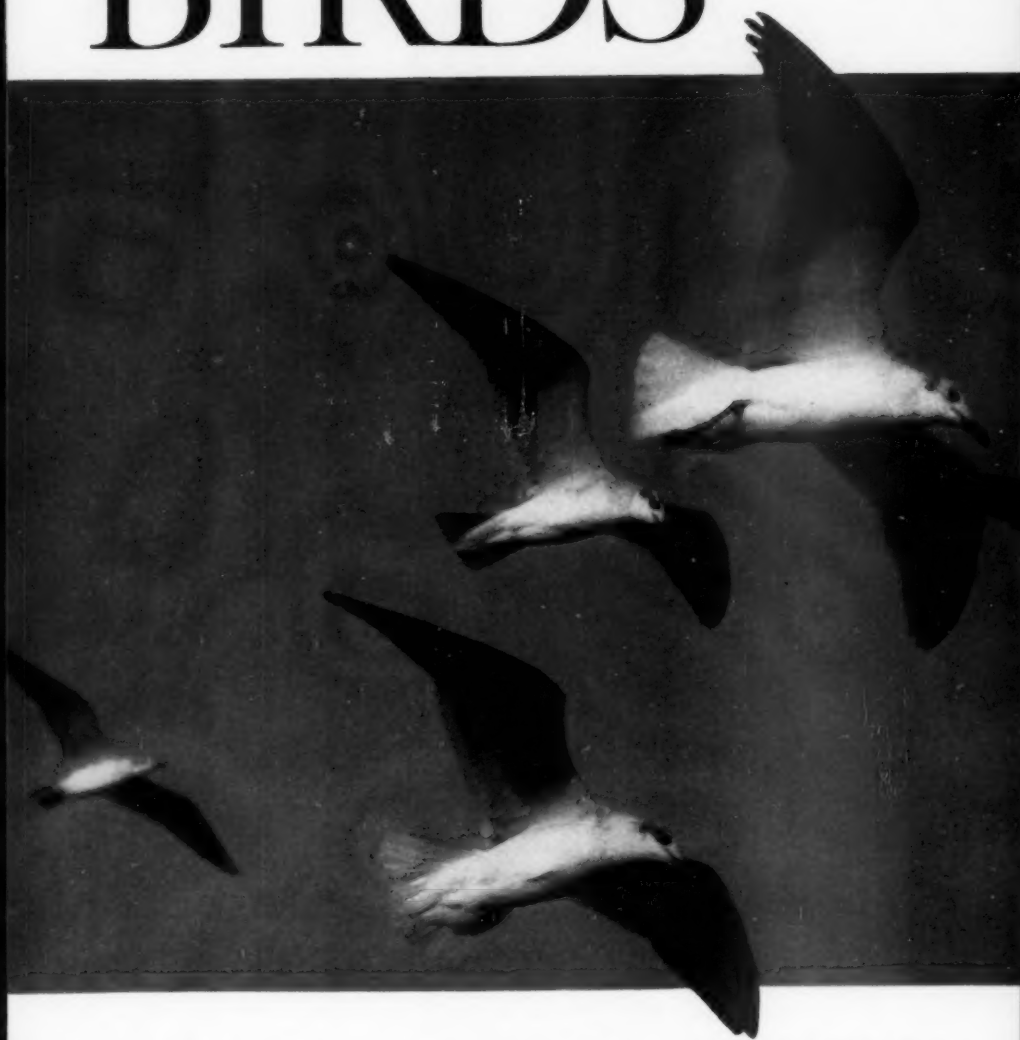


BIRDS



CORNELL SCIENCE LEAFLET

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BIRDS

RICHARD B. FISCHER

As robins and bluebirds, house wrens and barn swallows return to New York's villages and farms this spring, boys and girls—and mothers and fathers, too—will ask many questions about them. How do they fly? How did they find their way back? How do they obtain mates? What do they eat? Do we have many species (kinds) in New York? You will find answers to these and other questions as you read this Leaflet.

When you think of the fascinating things birds do, it is not surprising that man has studied them for thousands of years. Even prehistoric man wrote picture stories about birds on the walls of caves.

It has puzzled many persons how birds fly and stay up in the air. They are amazingly light for their size. Little birds such as wrens and chickadees weigh less than this Leaflet! Large hawks and owls seldom exceed six pounds. What makes them so light?

A bird's streamlined covering weighs little—you know the expression "as light as a feather." Air trapped between the 2000 feathers on a downy woodpeck-

er's body not only decreases its weight compared to its size, but it also insulates against cold winter air. Does this tell you why birds fluff out their feathers on cold days?

A bird's bones are thin and not filled with marrow like ours. They are hollow! Air sacs extend from the lungs to different parts of the body and even into some of the bones. So, much of what is inside a bird is just air!

As a bird flies, it moves its wings up and down with a peculiar twisting motion that has a



With such keen eyesight and acute hearing, the great horned owl catches many annoying rodents.

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Birds have amazingly keen vision. Sharp-eyed chimney swifts catch tiny insects in flight. Red-tailed hawks can easily detect field mice a quarter of a mile away. Great horned owls can see ten times better than we in dim light.

Bird eyes are enormous for the small size of their skulls. If their skulls were as large as ours, their eyes would be as big as tennis balls. Owls and other night-flying species have the largest eyes, while birds we see in our gardens (wrens, catbirds, chipping sparrows) have the smallest. Where would hawks' eyes come in this scale?

Inviting Bird Neighbors, the Leaflet for Spring 1953, has pictures and information about bills, feet, wings and tails. Write to Nature Education, 3 Stone Hall, Cornell University, Ithaca, New York for a copy.

Birds' hearing is also keen. Their huge ears, located behind the eyes, are covered with a thin screen of feathers. Look for them on the next dead bird you find. Owls have the best hearing; in total darkness, they can locate a mouse as it rustles dry leaves. During a war in Europe, some caged birds fidgeted when they heard the sound of warships' guns 200 miles away. Birds quickly learn what certain sounds mean.

When bombs exploded and churned up the ground during a war, birds soon appeared and feasted on exposed worms and grubs.

KINDS AND NUMBERS OF BIRDS

When ornithologists have visited the last unexplored regions of the world, they will add less than 15 new species to the list of 9,000 we already know. This is not many species, but scientists know more *about* birds than most other kinds of animals. Can you think of some reasons for this?

In North America there are about 650 species. Of the 400 species that New Yorkers record each year, almost 200 raise their young in this State.



Birds that accept different kinds of nesting places are likely to be abundant. This robin mother built her nest inside a greenhouse!

propeller effect. To stop, or fly backwards like a hummingbird, it reverses the pitch. Man discovered this method of stopping airplanes when you were a baby, but birds have used it for millions of years.

Look at the shape of the wings on a chicken, pheasant, or chickadee. Can you see that they are short and round? They are good for sudden, short bursts of speed. Swallow or killdeer wings are long and narrow—ideal for long graceful flight. Watch the birds that come to your feeding station, examine those your father shoots when hunting, and study dead birds you find on roadsides to see the shape of their wings and the way they fly. If you cut off dead birds' wings where they join the body and tack them, spread out, to a board, you will have a fine collection.

Structure (size and shape) determines many other bird activities. Wouldn't it be odd to see a barn swallow creeping up a tree trunk, or a woodpecker perching on a telephone wire? Although all birds are able to perch in some fashion, often their feet must also be used to catch and carry food. Frequently, foot and leg structure seem better for food-getting than for sitting. Ornithologists (persons who study birds scientifically) believe that millions of

years ago, when there were fewer bird species, there were fewer kinds of feet. As birds multiplied and changed into new species, their body parts changed too.

Some birds developed feet with long, strong toes that could grasp rough bark and enable them to climb straight up a tree. Some of these also had powerful bills to peck into wood and reach insects. When man got around to naming birds, he called such birds woodpeckers.

Predatory birds such as hawks are excellent fliers with strong legs and feet. They fly for hours or even days searching for food, and when they see a rat or rabbit they pin it down with their long, sharp talons. The duck hawk kills its prey in the air with a single powerful punch of its feet, then catches it before it reaches the ground! Strong, hooked bills enable hawks and owls to tear pieces out of large prey; they swallow small animals whole. While you make your wing collection, examine birds' feet and bills. Discover for yourself the structures that help to adapt each species to live as it does. If you cut a dead bird's legs off at the "knees" and pin them to a board in a lifelike position, they will dry that way. I often show my collection to persons who wonder how birds' legs and feet differ.

You can see more species in New York in mid-May than at any other time. Numerous migrating birds are present then, while some of the winter visitors are still with us. Bird watchers on Long Island sometimes observe 200 kinds in a single day.

Bird life is scarce during the winter in New York except on Long Island where the warmer climate encourages many birds to pass the winter.

WHERE BIRDS LIVE

Birds do not merely exist—they exist *somewhere*, and that somewhere is their habitat. A habitat provides everything a bird needs to survive as an individual and as a species. It offers food, hiding places, shelter from the weather, and places to rear young.

Birds are adapted to live in certain habitats because of their body structure. They can find proper food, locate nesting materials and a place to put them, and attract mates that also must live in that habitat.

If the habitat changes, its bird and other animal life will change also. Suppose *all* the woods and forests in New York disappeared. The ruffed grouse would become extinct in our state. Can you see that the best way to conserve our

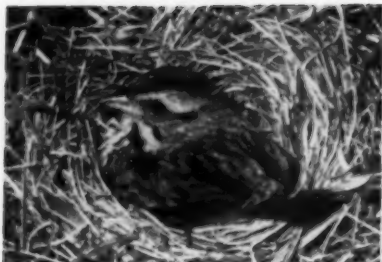


The pesky English sparrow was brought from Europe. It drives away our songbirds by taking their food, nesting materials and nesting places.

bird life is to preserve their habitats?

Farmlands offer the widest variety of habitats, therefore they have the most kinds of birds. Leaflet readers who live on or near farms usually can name more birds than other boys and girls because they have the best opportunities to observe them.

If you have guessed that the reason for New York's numerous bird life is its many kinds of habitats, you are correct. Not only do we have various types—farmlands, fields, woodlots, village gardens, swamps, and forests—but many are small and blend into one another and that makes



New York's most abundant bird, the song sparrow, is shown incubating its eggs.

Our most widespread and most numerous species is probably the song sparrow. You will never see many song sparrows at one time in one place; however, if you look and listen carefully in the breeding season (when they raise young), you will discover how abundant the bird is. It nests in almost every type of habitat (living place) we have. This is not true of certain species that seem to be abundant, such as the English sparrow and European starling. Those birds live near each other in towns and attract attention by their numbers and noisiness. That makes them seem more numerous than they really are.

The robin is probably our second most common bird. It inhabits almost as many living places as the song sparrow. These two species are more numerous now than in colonial times. Clearing forests for farmlands created more breeding places.

Rare birds? We are fortunate in not having any! If New York had rare birds, they would be nearly extinct species. However, we do have very few of some species common in Canada and the far north. There is a place near Tupper Lake in the Adirondacks where everything is so like Canada—the temperature, moisture, soil, plants, and animals—that the Canada jay nests there but nowhere else for miles around. Such birds are not truly rare even though they are uncommon here.

New York shares some species with the rest of the world. One is the barn owl; whatever country you visit, if there are barns, church steeples, abandoned houses, or hollow trees you can find this bird.



One of the few birds found all over the world, the barn owl, is a famous rat catcher.

birds raised last year. As the birds return to your neighborhood this spring, notice which appear first.

Most of New York's birds migrate at night. On a still May night you can hear their thin calls. Many are easy to identify—try it! If you have a telescope or field glasses, focus on the moon some May night and you probably will see birds fly by. They may seem high up, but actually our birds seldom fly as high as a mile.

What about nonmigratory birds—the chickadees, woodpeckers, blue jays, nuthatches and ruffed grouse? They do not require just one kind of food. Their varied diets of dry berries, seeds, buds, nuts, acorns, spiders' eggs, insect eggs and cocoons enable them to remain here the year around. We call them permanent residents; the others are summer residents.

Scientists are still trying to discover how migrating birds find their way. Without instruments or maps, they fly thousands of



Open, sandy beaches are the nesting places of sea birds. This common tern is found on Long Island's south shore.



The numbered band on this blue jay's leg revealed that he remained in Ithaca winter and summer.

miles over trackless oceans and forests, often at night. Besides, each species goes to the same place in winter and returns to last summer's home in spring. One American ornithologist believes that pigeons navigate by "feeling" the earth's magnetism. A German has learned that some birds can tell direction from the sun's position, while others use the stars as do airplane navigators.

BEGINNING OF NESTING

Bird banders (persons who place numbered metal bands on birds' legs) have found that many New York birds return each spring to the place where they lived last summer. At Beaver Kill I banded a chimney swift that returned to the same corner of a barn for five years, and a house wren that came back to the same bird box for three summers. Young birds seldom return to their birthplaces. Instead, they

additional types. In the following table you will find five of New York's many habitats with a list of some typical birds of each. How many of the birds could you name if you saw them on a hike?

As you study birds you will notice that certain habitats have variety and numbers while others have small numbers of few species. You will also realize that birds tend to occupy certain parts of their habitats, especially when nesting. Without thinking about it, you will look for killdeer in barren areas of fields, woodpeckers on dead trees, barn swallows in the haymow but eave swallows outside under the roof overhang. Can you add other examples to this list of birds and their nesting places?

MIGRATION

Although our New York habitats are fine in summer, many species of birds cannot live in them in winter. Insects are scarce, worms dig deeper, berries are fewer, and snow covers food on the ground. Therefore many birds migrate (fly) to the warm south. If the summer birds could obtain enough food to keep up their body heat they might not migrate. However, ornithologists believe that things besides scarce food cause birds to migrate.

As the days grow longer in spring, changes take place inside the birds. They become restless in their southern winter homes and migrate north again. The old males generally arrive here first, followed by females, then by

New York Habitats and Some of their Typical Birds

Farmlands	Villages	Swamps	Seashore	Forests
Song sparrow	Song sparrow	Red-wing	Song sparrow	Chickadee
Robin	Robin	Marsh wren	Red-wing	Downy woodpecker
English sparrow	English sparrow	Green heron	Common tern	Hairy woodpecker
European starling	European starling	Black duck	Herring gull	
Chimney swift	Chimney swift	Yellow warbler		
Barn swallow	Rock dove (pigeon)			
Bluebird	Wood thrush			
Crow	Blue jay			
Killdeer				
House wren				
Catbird				
Flicker				
Chipping sparrow				
Phoebe				

does not even know where it is! Does this mean that male birds are lazy? Of course not. They have other jobs to do. Woodpeckers and the English sparrow are our only species in which males do most of the nest building.

All sorts of places serve as nest sites. Here is a partial list with a few New York birds that use them. How many can you add?

Tree branches: Robin, hummingbird, crow, blue jay, orioles

Holes in trees: Chickadee, bluebird, house wren, woodpeckers, English sparrow, European starling, owls

Bushes: Robin, catbird, song and chipping sparrows

Buildings (outside): Robin, phoebe, barn and eave swallows, pigeon

Buildings (inside): Robin, phoebe, barn swallow, chimney swift



The killdeer's eggs blend perfectly with the pebbles and grasses of open fields.

Bare ground: Killdeer, common tern, herring gull

Holes in ground: Kingfisher, bank swallow

Nests are surely wonders of the bird world. Their beautiful construction and the clever way they are hidden fill us with admiration. Without receiving lessons, each bird knows how to make a nest just like its parents made. Size and shape, the materials in it, how and where it is placed are so similar that we can easily tell the different species apart. The familiar birds of farm and village require only about a week to complete their nests.

For a thrilling experience, observe nest building this spring. Get a cardboard carton large enough for you to sit inside. Cut nickle-sized peep holes in various places. Set this blind about 25 feet from a nest, drape some leafy branches over it, and slip inside with your notebook. Write down what you see *right away*, not later for we sometimes forget important things. You are likely to see things that few persons have witnessed. This is one way ornithologists study birds.

LAYING THE EGGS

Mother birds begin to lay eggs a day or two after the nest is completed. The birds we see most often deposit an egg each day,



Chimney swifts often build their strange stick-and-saliva nests in hay-mows.

find new areas. This helps a species to spread out.

Soon after returning, males look around for habitats in which to breed. On finding a place that offers the things it will need (look on page 7 if you do not remember), the male attracts attention by singing, pounding on dead wood, fluffing out his feathers, and flying about. This tells females of his species that he has a nesting place, and it warns other males to stay away or there may be a fight.

Most males have special places from which they sing and display themselves several times each day. These act as boundary markers for the home territory. A male will attack any male of his species

that trespasses, though he pays little attention to males of other species.

Territory size varies widely with birds. Eave (cliff) swallows crowd their nests one against the other but crows require territories of many acres.

A male on territory attacks every trespasser of *his* species. If the visitor fights back, he "decides" it is a male and drives it away even though it might be a female. Should the trespasser permit the attack, the owner of the territory "thinks" it is a female. He will sing and display and occasionally attack it during the next few days. If it is a female and she accepts the male and his territory, they become a pair.

If the sexes are differently colored, males usually recognize females by their appearance. However, if a female acts like a male, the male will attack her no matter what she looks like.

NESTS AND NEST BUILDING

Male birds generally select and defend the nesting territory, but it is the female who chooses the exact place for the nest. In general, she does most of the building. Female orioles and horned larks make the nest without any help from the males. Not only does the mother hummingbird build the nest, but the father

A bird that incubates usually possesses a brood patch (bare area) on its abdomen which it presses gently against the eggs. When the bird is not brooding, feathers conceal the brood patch. Eggs under the sitting bird are at about 93° F. and the little bird slowly develops inside.

While his mate sits, the male remains nearby. He protects their territory by singing and patrolling the boundary. If the female flies off for food, water, or just a rest, he often guards the eggs. Male chickadees, goldfinches (wild canaries) and blue jays frequently feed their sitting mates. This does not mean such birds love their mates more—they do it because their species has always done that.

After sitting for half an hour, a bird gets fidgety and flies off. Birds seldom leave eggs uncovered for longer than 15 minutes since the embryos might die if their temperatures dropped only as low as 80° F.

Most of our garden and village birds incubate for two weeks. When eggs are about to hatch, the parents can hear peeping sounds inside and they feel them trembling as the babies peck their way out. Sometimes they help the young ones to emerge. The adults usually carry the egg shells far away. Can you guess why?



Most common birds are altricial as this naked, helpless chimney swift.

YOUNG AND THEIR CARE

Some birds hatch helpless and nearly naked. They are called *altricial* (al-trish'-ill). Most of our songbirds are altricial. Their young stay in the nest for approximately two weeks while both parents struggle to bring enough food to keep up with their growing appetites. Each nestling eats about half its own weight in food daily. One man saw house wrens carry food to their young 500



This baby spotted sandpiper is precocial. It left the nest on the day it hatched.

although the chimney swift is a strange exception. The mates take so long to finish their stick and saliva nest that the female begins laying eggs when the nest is half finished. They continue building until the eggs hatch.

The majority of familiar birds deposit an egg each day, frequently before noon. Three to five is commonly the number in a set. You will count two eggs in the nests of pigeons, hummingbirds, or the great horned owl. But do not be surprised to see 15 in a duck or pheasant nest.

It is best to stay away from nests containing eggs or the birds may desert them. In addition, you might reveal their presence to creatures that eat eggs. Of course you will not take eggs from a nest, for that is cruel and illegal.

As you would expect, our tiny hummingbird lays the smallest eggs, about the size of a bean. The largest eggs you are likely to see outside a zoo are those of the mute swans that nest in parks; they resemble a stretched-out indoor baseball. Birds whose young run about right after hatching lay larger eggs than species with naked, helpless nestlings. A killdeer and a robin are equal in size, yet the killdeer's eggs are nearly twice as large as the robin's.

Have you noticed that most

eggs are spotted or scrawled with colors? That helps to hide them. Eggs of hole-nesting birds are less exposed to prying eyes and tend to be white.

INCUBATION

On distant South Sea Islands live the curious mound birds, one of the few birds that does not incubate (warm) eggs. Instead, the female buries them in mounds of warm, decaying plant matter or in warm sand. After hatching, the young dig their way out and fly away!

As in nest building, the females of our familiar species generally do all or most of the incubating. A few exceptions are woodpeckers (males do most of the sitting), and pigeons, cuckoos, owls, and starlings (in which the sexes share the task).



Some birds, such as this male chickadee, feed their mates while they incubate.

times in one day. Another counted 845 feedings by a pair of phoebes! Can you see why you should not attempt to raise a baby bird?

A few birds such as chickens and pheasants are *precocial* (pre-ko'shil). This means they are covered with down and run around an hour after hatching.

Have you wondered how a parent knows which youngster to feed? Well, if a nestling is hungry, it will raise its head, open its mouth and "beg" when a parent arrives. If all the young beg, the adult feeds the one who begs hardest. Nestlings that get fed do not beg the next time the parent comes with food, so the others have their turns.

During the first week of nest life the parents sit on their young at intervals to warm them. After



The baby robin that begs hardest for food is the one who will be fed.

a week the young can see and become quite well feathered. They grow rapidly and begin to take an interest in things around them. They sometimes beg at passing birds of other species, stare at objects nearby, and crouch down when intruders appear.

Soon the nest is bulging with fidgety, jostling youngsters. In some way they know when it is time to depart. After much hesitation the first nestling flutters off. The parents stay near him and chirp, which seems to encourage the others to leave also. This is their most perilous time, for the young are not able to fly well. Predators and the weather take a heavy toll.

Even if a young bird survives the first week out of the nest, it is not likely to live longer than two years. You can help the birds by keeping your cat indoors at night in summer, for we know they kill large numbers of birds at that time.

For the next two to four weeks the family wanders about feeding and resting. In time they become separated and soon each bird is on its own.

WHAT GOOD ARE BIRDS?

You and I place great value on the pleasure we get from the beauty of birds, their songs, and

their interesting ways. Millions of other persons place the same value on birds. But birds have other merits.

Birds are extremely important in keeping living things from becoming too numerous. Not only do they consume unbelievable quantities of insects, but at times they have saved people's lives by destroying crop-eating insects. Have you read about the statue the Mormons built in honor of gulls?

Hawks and owls live mainly on the rodents that attack our fruit trees, grains, poultry, and livestock foods as well as eggs and

the young of wild birds. In New York no one may kill any hawk or owl unless it is bothering his farm animals.

Along our highways, vultures and crows (scavengers) remove many dead birds and mammals. At the seashore, gulls are constantly cleaning up offensive dead fish, clams, and crabs.

Droppings from berry-eating birds contain many seeds. The new plants they produce provide food for game species such as pheasants, quail, and ruffed grouse.

Thousands of persons earn a living from birds' feathers. They put them in sleeping bags and warm clothing. Other people decorate hats with feathers from domestic birds. Some persons make artificial flies by tying feathers of certain unprotected birds to fish hooks.

Birds are important laboratory animals. Scientists study the way birds behave, the diseases they get, and the food they eat. If we know more about birds, we can use our knowledge to understand other animals better — including ourselves.

When we think about them in this way, birds have a great deal of plain dollars and cents value, haven't they? Nevertheless, the pleasure they provide is their greatest value for most of us.



This house wren fed thousands of insects to its young.

SOME DO'S AND DON'TS

Do

Do see how many new birds you can identify this spring.

Do hang short pieces of yarn and string on bushes. You will enjoy watching birds carry them off for nesting material.

Do make bird houses this spring. "Inviting Bird Neighbors," the Leaflet for Spring 1953, has many suggestions.

Do put baby birds you find on the ground in a berry basket fastened five feet up in a bush. The parents will care for it.

Do try to learn some bird songs. The Cornell records will provide both help and pleasure.

Don't

Don't go bird watching with a crowd. You will see more alone.

Don't visit nests more than once a day. Something might eat the eggs or young, or the parents might desert them.

Don't make the hole in a bird house larger than $1\frac{1}{2}$ inches. Starlings might enter and drive your birds away.

Don't think that every little bird you find on the ground has a broken wing. It probably just left its nest and cannot fly well.

Don't stop reading about birds with this Leaflet. Books in your library tell more about them.

MARCH 1959



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